

## Portable Thermal Linescan Inspection System, Phase I

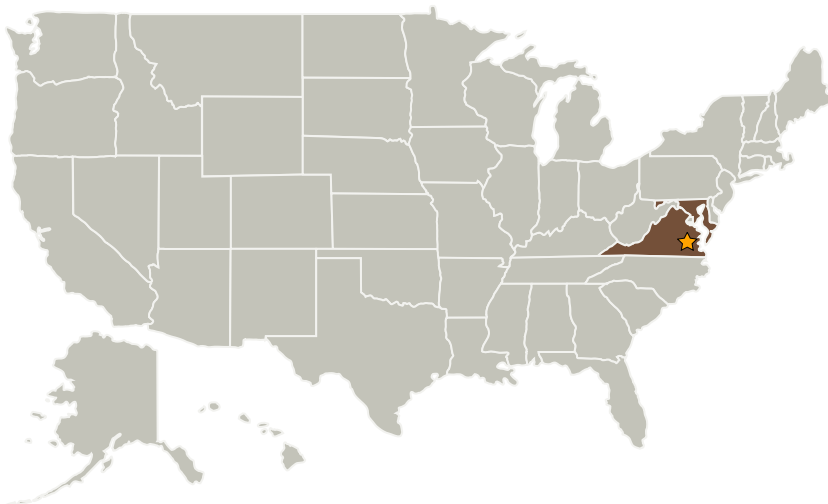
Completed Technology Project (2004 - 2005)



## Project Introduction

Harsh Environment Applied Technologies, ThermTech Services and James Madison University have formed a research and development team to investigate the design of a portable thermal line scanning inspection system. The technique involves the movement of a linear heat source across the outer surface of the tubing followed by an infrared imager at a fixed distance behind the heater. Quantitative images of the material loss due to corrosion are reconstructed from measurements of the induced surface temperature variations. The application of the thermal line source coupled with the analysis technique represents a significant improvement in the inspection speed and accuracy for large structures such as boiler water-walls. Wall thinning due to corrosion in utility boiler water-wall tubing is a significant operational concern for boiler operators. Conventional ultrasonic inspection is currently used. This is very manpower intense and slow. Thickness measurements are typically taken over a relatively small percentage of the total boiler wall and statistical analysis is used to determine the overall condition of the boiler tubing. Other inspection techniques, such as electromagnetic acoustic transducer (EMAT), have recently been evaluated; however they provide only a qualitative evaluation, identifying areas where corrosion has significantly reduced the wall thickness. ThermTech Services in cooperation with NASA Langley Research Center has developed a thermal NDE technique designed to quantitatively measure the wall thickness and thus determine the amount of material thinning present in steel boiler tubing. This STTR proposal is focused on further development of this innovative but proven technique to expand into the inspection of aerospace superstructures and eventually in orbit applications.

## Primary U.S. Work Locations and Key Partners



Portable Thermal Linescan  
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## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission  
Directorate (STMD)

### Lead Center / Facility:

Langley Research Center (LaRC)

### Responsible Program:

Small Business Innovation  
Research/Small Business Tech  
Transfer

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| Organizations Performing Work              | Role                    | Type        | Location            |
|--|-------------------------|-------------|---------------------|
| ★ Langley Research Center(LaRC)            | Lead Organization       | NASA Center | Hampton, Virginia   |
| Harsh Environment Applied Technologies Inc | Supporting Organization | Industry    | Annapolis, Maryland |

| Primary U.S. Work Locations |          |
|-----------------------------|----------|
| Maryland                    | Virginia |

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

## Technology Areas

**Primary:**

- TX14 Thermal Management Systems
  - └ TX14.2 Thermal Control Components and Systems
    - └ TX14.2.2 Heat Transport